large jets of air and gas from the ports must be given time to mix. With too short a furnace the flame will extend beyond the hearth. With too long a furnace the gases of combustion will tend to drop below the bath temperature.

There are three limitations on the width of the furnace:

1. The distance material can be thrown through the door by expert manipulation of a shovel or a dolomite gun.
2. The width the flame can be spread.
3. The limitation due to the strength of the roof.

The first controls patching and making bottom. Furnaces have been built to 16.75 ft wide. This is rather close to the limit.

Table 2 gives the hearth dimensions of a number of furnaces in service. It shows a considerable diversity in the ideas regarding this portion of the furnace. Table 3 gives the minimum and maximum values from Table 2.

TABLE 1

HEARTH AREA OP OPEN-HEARTH FURNACES FOR VARIOUS DEPTHS OF MOLTEN METAL

Capaci of Furnac JL ons	Cu Ft Molten Metal	Depth of Bath of Molten Metal, In.								
		12	15	18	21	24	27	30	33	36
		(Hearth area in square feet)								
15	78.45	235	188	15	135	118				
20	104 .60	314	252	21	180	157	139			
25	130.75	392	314	26	225	196	174			
30	156.90	471	376	31	270	235	209	189		
35	183.05	549	440	35	316	275	244	220	201	
40	209 .	628	504	42	360	314	278	256	229	20
50	261 .	785	629	52	450	392	350	325	286	26
60	313.80	941	755	62	542	471	418	377	343	31
75	392.25	1177	940	78	674	588	523	470	429	39
90	470.70	1412	1130	94	812	706	628	567	515	47
100	523.00	1569	1255	105 0	900	785	697	629	573	52 3

Allow from 3 to 6 in for cinder and boil.

volume of molten metal in charge;

Formula: $\frac{y}{d}3 — \sim A.$ In which

d = depth of bath ; metal only ; A = area of hearth required. Weight of molten metal, 430 Ib per cubic foot; 5.23 cu ft per ton.